pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHEAST REGIONAL OFFICE
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0013714**
Facility Type	**Industrial**	APS ID	**991766**
Major / Minor	**Major**	Authorization ID	**1270579**

NPDES PERMIT FACT SHEET ADDENDUM

Applicant and Facility Information

Applicant Name	**Exelon Generation Co. LLC**	Facility Name	**Eddystone Generating Station**
Applicant Address	Eddystone Generating Station 1 Industrial Highway, Eddystone, PA 19022	Facility Address	1 Industrial Highway Eddystone, PA 19022
Applicant Contact	Joseph Dick	Facility Contact	Joseph Kuklinski
Applicant Phone	(267) 533-1149	Facility Phone	(610) 595-8199
Client ID	147686	Site ID	239482
SIC Code	4911,5171	Municipality	Eddystone Borough
SIC Description	Trans. & Utilities - Electric Services,Wholesale Trade - Petroleum Bulk Stations And Terminals	County	Delaware
Date Published in PA Bulletin	07-18-2020	EPA Waived?	No
Comment Period End Date	08-17-2020	If No, Reason	[FORMTEXT]

Purpose of Application: Application for a renewal of an NPDES permit for discharge of treated Industrial wastewater.

Internal Review and Recommendations

Draft permit was issued on June 23, 2020.

Based on the discussion with EPA the following details have been incorporated in to the fact sheet:

(i) The section **Clean Water Act § 316(b) – Cooling Water Intake Structures** is revised as follows including a clear summary of BTA and SOP conditions:

On August 15, 2014, EPA promulgated Clean Water Act Section 316(b) regulations applicable to cooling water intake structures. The regulations established best technology available (BTA) standards to reduce impingement mortality and entrainment of all life stages of fish and shellfish at existing power generating and manufacturing facilities. The Final Rule took effect on October 14, 2014. Regulations implementing the 2014 Final Rule (and the previously promulgated Phase I Rule) are provided in 40 CFR Part 125, Subparts I and J for new facilities and existing facilities, respectively. Associated NPDES permit application requirements for facilities with cooling water intake structures are provided in 40 CFR Part 122, Subpart B – Permit Application and Special NPDES Program Requirements (§ 122.21(r)).

Applicability Criteria for Existing Facilities

As an existing facility, Exelon Eddystone falls under 40 CFR part 125, Subpart J – Requirements Applicable to Cooling Water Intake Structures for Existing Facilities Under Section 316(b) of the Clean Water Act (§§ 125.90 – 125.99). Pursuant to the applicability criteria given by § 125.91(a), Exelon Eddystone would be subject to the requirements of §§ 125.94 – 125.99 if:

Approve	Return	Deny	Signatures	Date
X			*Sara Abraham* Sara Reji Abraham, E.I.T. / Project Manager	September 9, 2020
X			*Pravin Patel* Pravin C. Patel, P.E. / Environmental Engineer Manager	09/11/2020
X			Thomas L. Magge / Program Manager	September 14, 2020

Internal Review and Recommendations

(1) The facility is a point source;

(2) The facility uses or proposes to use one or more cooling water intake structures with a cumulative design intake flow (DIF) of greater than 2 million gallons per day (mgd) to withdraw water from waters of the United States; and

(3) Twenty-five percent or more of the water the facility withdraws on an actual intake flow basis is used exclusively for cooling purposes.

Exelon Eddystone is a point source as defined in 40 CFR § 122.2 and withdraws water for industrial use from a cooling water intake structure (CWIS) on the Delaware River Estuary. The facility is an "existing facility" as defined in in 40 CFR § 125.92(k). The intake structure has four separate intake bays that each house a cooling water pump (CWP) with a rated capacity of 198 MGD and a river water pump (RWP) with a rated capacity of 10.8 MGD. The facility has a total DIF of 835.2 MGD with an AIF of 262.6 MGD between 2013 – 2017, 99.9% of which is used for cooling purposes, which exceeds the 25% applicability threshold and, therefore, Exelon Eddystone is subject to the requirements of 40 CFR §§125.94 – 125.99.

The CWIS forebay was built 13 ft into the river rather than flush with the bulkhead. Water passes under a curtain wall and through vertical-bar trash racks prior to the installed conventional traveling screens with 3/8 in. mesh. Through screen velocity at DIF is 0.88 fps. Screens are rotated once each 8-hour shift, once every 4 hours if freezing conditions, or continuously as need during fall leaf season. Debris is removed by a high-pressure spray wash for disposal. Lateral fish passages upstream and downstream in the forebay, which can be sealed off if needed for maintenance, are located between the trash racks and the traveling screens.

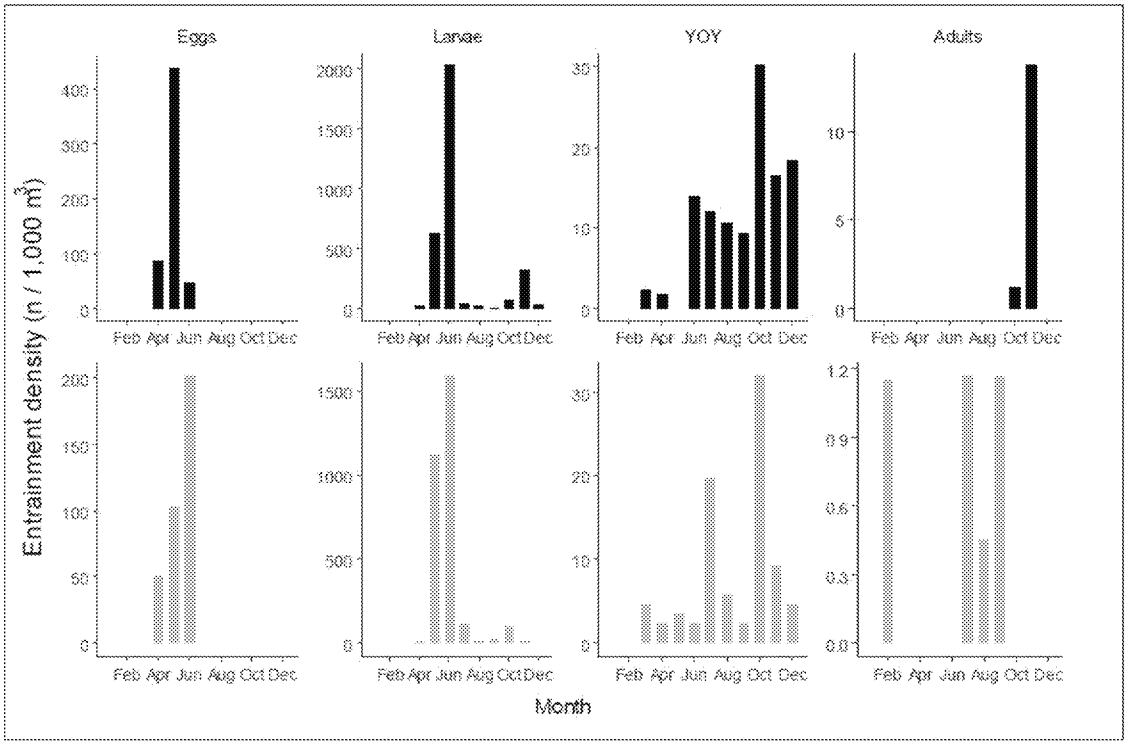
Eddystone is a dual-fueled (natural gas and oil), steam electric generating station that operates when notified by PJM Interconnection, LLC during periods of peak demand. For the 24-month contiguous period from 2016-2017 the facilities capacity utilization rate (CUR) was 1.7%. The past 5 years average CUR was 1.9% with an annual minimum of 0.7% and a maximum of 3.4%.

Based on a CUR less than 8 percent averaged over a 24 month block contiguous period and site-specific data, impingement mortality BTA less stringent than one of the 7 technologies described in the rule, as specified in §125.94(c)(12), will be used for Exelon Eddystone. This includes permit conditions to maintain a CUR below 8% and implementing a Flow Reduction Alternative SOP (details included at the end of this section) proposed in the permit application which will further reduce withdrawals by limiting CWP usage. These permit conditions will also serve as site specific entrainment BTA based on the alternatives analysis and the totality of the information provided in the facility's 316(b) report provided with the permit application. In addition, two years of impingement sampling will be required, as allowed by 40 CFR §125.96(a), to demonstrate compliance and ensure impacts to shellfish and other fish have not significantly changed since the last impingement study.

1.) Numbers and types of organisms entrained

The facility conducted entrainment sampling for two years between 2016 and 2017. During that time sampling events were conducted every month with weekly samples taken during expected peak abundance times March – July. Sample ports were located directly behind the traveling screens at two locations in the water column (deep and shallow). Four diel sample periods collecting approximately 100 cubic meters of water were collected each day according to the sampling plan. Below are tables and a chart submitted by the permittee showing monthly entrainment densities, numbers and types of organisms collected during sampling for each year, and total entrainment estimates based on densities and AIF for each year.

Internal Review and Recommendations



Monthly distribution of ichthyoplankton entrainment densities observed at Eddystone during the 2016 (black) and 2017 (gray) entrainment studies. Densities are summed across all ichthyoplankton species for each of the four life stages.

Figure VI-1

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	Life Stage							
Taxon	Eggs	YSL	PYSL	YOY	YROL	Unid.	Post-larva	Total
Alewife	0	0	0	5	0	0	0	5
American Eel	0	0	0	13	0	0	0	13
American Shad	2	0	17	1	0	0	0	20
Atlantic Croaker	0	0	200	36	0	4	0	240
Atlantic Menhaden	0	0	84	0	0	0	0	84
Atlantic Silverside	0	0	1	0	0	0	0	1
Banded Darter	0	0	1	0	0	0	0	1
Bay Anchovy	0	0	28	6	0	4	0	38
Black Crappie	0	0	2	0	0	0	0	2
Blue Crab	0	0	0	0	0	0	9	9
Blueback Herring/Alewife	26	1	8	0	0	0	0	35
Blueback Herring/Hickory Shad/Alewife	206	2	137	0	0	0	0	345
Blueback Herring/Hickory Shad/Alewife/Gizzard Shad	0	1	3966	0	0	2	0	3969
Bullhead Catfish Family	0	0	0	2	0	0	0	2
Carp and Minnow Family	1	9	58	0	0	23	0	91
Channel Catfish	0	0	0	8	0	0	0	8
Common Carp	0	0	2	0	0	0	0	2
Darter Species	0	0	0	0	0	1	0	1
Flathead Catfish	0	0	0	1	0	0	0	1
Gizzard Shad	133	74	0	0	0	0	0	207
Grass Shrimp	0	0	0	0	0	0	6	6
Herring Family	4	0	96	0	0	0	0	100
Hogchoker	0	0	1	7	1	0	0	9
Inland Silverside	0	0	4	0	0	0	0	4
Lepomis Species	0	0	4	0	0	0	0	4
Morone Species	0	0	99	0	0	5	0	104
Naked Goby	0	0	1	3	0	0	0	4
New World Silverside Family	0	0	1	0	0	0	0	1
Striped Bass	6	35	386	10	0	0	0	437
Striped Killifish	0	1	0	0	0	0	0	1
Summer Flounder	0	0	1	0	0	0	0	1
Tessellated Darter	0	33	3	0	0	1	0	37
Unidentified Osteichthyes	0	0	2	0	0	8	0	10
White Perch	677	3	570	15	0	1	0	1266
Yellow Perch	0	0	1	0	0	0	0	1
Total	1055	159	5673	107	1	49	15	7059

2016 entrainment sampling data

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Table 5.2-2. Total number of each life stage of fish and shellfish collected in Eddystone Generating Station entrainment samples during 2017.

	Life Stage							
Taxon	Eggs	YSL	PYSL	YOY	YROL	Unid.	Post-larva	Total
American Eel	0	0	0	14	1	0	0	15
American Shad	0	1	54	2	0	0	0	57
Atlantic Croaker	0	0	46	23	0	11	0	80
Atlantic Menhaden	0	0	30	4	0	0	0	34
Atlantic Sturgeon	0	1	0	0	0	0	0	1
Bay Anchovy	0	0	60	3	0	0	0	63
Carp and Minnow Family	0	80	64	1	0	11	0	156
Channel Catfish	0	0	0	23	1	0	0	24
Common Carp	0	5	5	0	0	4	0	14
Crappie Species	0	0	1	0	0	0	0	1
Flathead Catfish	0	0	0	3	0	0	0	3
Gizzard Shad	390	104	0	0	0	0	0	494
Herring Family	0	0	150	0	0	0	0	150
Hogchoker	0	0	0	1	1	0	0	2
Lepomis Species	0	0	10	0	0	0	0	10
Morone Species	0	0	227	0	0	184	0	411
Mummichog	0	0	1	0	0	0	0	1
New World Silverside Family	0	0	3	0	0	0	0	3
Rough Silverside	0	0	1	0	0	0	0	1
Striped Bass	7	63	1195	0	0	0	0	1265
Tessellated Darter	0	26	11	0	0	0	0	37
White Perch	250	8	381	10	0	0	0	649
Yellow Perch	0	1	0	0	0	0	0	1
Blueback Herring/Alewife	3	0	0	1	0	0	0	4
Blueback Herring/Hickory Shad/Alewife/Gizzard Shad	2	0	2754	0	0	0	0	2756
Blueback Herring/Hickory Shad/Alewife	12	1	0	0	0	0	0	13
Blue Crab	0	0	0	0	0	0	8	8
Grass Shrimp	0	0	0	0	0	0	2	2
Unidentified Osteichthyes	8	0	2	0	0	3	0	13
Total	672	290	4995	85	3	213	10	6268
Percent Composition	10.7	4.6	79.7	1.4	0.0	3.4	0.2	100.0

2017 entrainment sampling data

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Table VI-1a

Annual entrainment for taxa and lifestages collected in the 2016 entrainment study at Eddystone based on the actual volume of water withdrawn during 2016

	Life stage							
	Eggs		Larvae		YOY		Adults	
Taxon	No. entrained	Std. dev.	No. entrained	Std. dev.	No. entrained	Std. dev.	No. entrained	Std. dev.
Alewife	0	0	0	0	138,649	113,302	0	0
American eel	0	0	0	0	222,078	51,248	0	0
American shad	21,278	21,278	480,928	92,576	22,229	22,229	0	0
Atlantic croaker	0	0	8,404,409	664,219	1,697,784	336,699	0	0
Atlantic menhaden	0	0	1,932,455	330,005	0	0	0	0
Atlantic silverside	0	0	115,540	45,381	0	0	0	0
Bay anchovy	0	0	1,997,157	504,022	402,314	247,987	0	0
Black crappie	0	0	37,523	37,523	0	0	0	0
Blue crab	0	0	0	0	522,449	147,369	0	0
Bluegill	0	0	96,120	53,304		0	0	0
Catfish	0	0	0	0	516,805	118,904	0	0
Grass shrimps	0	0	0	0	0	0	246,242	111,624
Gizzard shad	3,383,138	615,823	1,545,025	215,591	0	0	0	0
Goby	0	0	45,051	45,051	287,898	287,898	0	0
Herrings	5,863,864	1,024,726	97,894,946	12,948,818	0	0	0	0
Hogchoker	0	0	45,051	45,051	402,176	145,029	30,867	30,867
Killifish	0	0	21,605	21,605	0	0	0	0
Minnows	29,335	29,335	2,360,292	253,081	0	0	0	0
Striped bass	140,176	37,773	13,783,332	889,646	265,338	109,901	0	0
Summer flounder	0	0	40,120	18,054	0	0	0	0
White perch	17,307,307	1,119,538	13,545,632	1,632,582	447,289	86,615	0	0
Yellow perch	0	0	10,168	10,168	0	0	0	0
Other species[1]	0	0	1,025,180	477,285	222,078	103,391	0	0
Unidentified	0	0	421,314	0	0	0	0	0

[1] 'Other Species' includes common carp, darters, and *Lepomis* spp.

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Table VI-1b
Annual entrainment for taxa and lifestages collected in the 2017 entrainment study at Eddystone based on the actual volume of water withdrawn during 2017

	Life stage							
	Eggs		Larvae		YOY		Adults	
Taxon	No. entrained	Std. dev.	No. entrained	Std. dev.	No. entrained	Std. dev.	No. entrained	Std. dev.
Alewife	0	0	0	0	0	0	0	0
American eel	0	0	0	0	304,608	90,109	33,457	33,457
American shad	0	0	1,017,877	334,301	33,068	33,068	0	0
Atlantic croaker	0	0	2,897,566	458,087	1,008,639	204,411	0	0
Atlantic menhaden	0	0	453,158	167,585	70,103	32,708	0	0
Atlantic silverside	0	0	117,447	55,622	0	0	0	0
Bay anchovy	0	0	1,956,490	342,688	99,163	99,163	0	0
Black crappie	0	0	17,674	17,674	0	0	0	0
Blue crab	0	0	0	0	177,297	81,557	0	0
Catfish	0	0	0	0	835,592	71,977	23,192	23,192
Grass shrimps	0	0	0	0	0	0	77,678	35,732
Gizzard shad	8,065,547	2,106,926	2,076,389	454,198	0	0	0	0
Goby	0	0	0	0	0	0	0	0
Herrings	236,409	75,831	55,892,920	4,926,822	16,889	16,889	0	0
Hogchoker	0	0	0	0	17,061	17,061	33,382	33,382
Killifish	0	0	0	0	17,049	17,049	0	0
Minnows	0	0	3,133,496	595,059	16,885	16,885	0	0
Striped bass	119,914	72,262	38,358,380	7,036,848	0	0	0	0
Summer flounder	0	0	0	0	0	0	0	0
White perch	4,011,201	528,135	8,064,494	871,863	253,728	80,019	0	0
Yellow perch	0	0	6,589	6,589	0	0	0	0
Other species[1]	0	0	1,183,942	544,613	304,608	140,120	33,457	15,390
Unidentified	123,789	67,760	141,116	83,442	0	0	0	0

[1] 'Other Species' includes Atlantic sturgeon, common carp, *Lepomis* spp., and tessellated darter

The entrainment report concludes that an estimated 345,809,051 fish eggs and larvae would be entrained annually based on DIF and 108,565,660 based on AIF, which is a 68.6% reduction. The most abundant group of taxa entrained during the study included blueback herring/hickory shad/alewife/gizzard shad from the Clupeid family making up 53.4% of the abundance. Other more abundant taxa included white perch, Atlantic Croaker, and striped bass. The Assessment of Potential Effects of Entrainment on Sustainability of Fish Stocks report provided with the application concludes that based on the entrainment study and Spawning Potential Ratios, the magnitude of effects of entrainment at Eddystone on Delaware River fish populations at DIF is likely too small to jeopardize the sustainability of those fish populations. Additionally, one Atlantic sturgeon, a federally endangered species, larvae was entrained during the study. Exelon subsequently evaluated the susceptibility of the species to entrainment as part of an Individual Incidental Take Permit (IITP) with NMFS and found that AIF conditions would not be expected to jeopardize the population. Further details are provided in the entrainment BTA Worksheet.

2.) Impact of changes in particulate emission or other pollutants

Exelon evaluated several technology alternatives which showed varying changes in particulate matter (PM) and other pollutants. Exelon concluded that their proposed Flow Reduction Alternative would result in a reduction in emissions of these pollutants due to decreased energy use while the other alternatives would increase these emissions due to increased energy use and installation. The smallest increase would result with the installation of coarse cylindrical wedge wire screens (CWWS). Further details are provided in the entrainment BTA Worksheet.

3.) Land Availability

Installation of CWWS would require a modification to the facility's existing Submerged Lands License Agreement. Installation of plume-abated mechanical draft cooling towers would require adjacent property by lease or purchase and was deemed feasible in the application.

Internal Review and Recommendations

4.) Remaining useful plant life

Exelon provides an anticipated retirement date of 2033. Based on installation requirements Exelon estimates that the evaluated technologies would be in service ranging from 9-14 years. The longest being the proposed Flow Reduction Alternative (14 years), and the shortest being a closed cycle recirculating system (CCRS) (9 years).

5.) Social Benefits and Cost of Technologies

Social benefits and costs for the evaluated technologies were presented and appear robust. The proposed Flow Reduction Alternative results in a net savings when calculating cost and results in the greatest monetized benefits. The costliest technology would be installation of the CCRS. Further details are provided in the entrainment BTA Worksheet.

Other Discretionary factors

1.) Exelon indicates that current estimated entrainment at DIF is likely too small to jeopardize the sustainability of fish populations. They also show that the technologies evaluated would further reduce entrainment, with the CCRS having the greatest impact with a 98.6% decrease assuming 0% survival through the system.
2.) Exelon concludes there are no significant benefits to water quality or aquatic biota resulting from reduced thermal discharge effects of the evaluated technologies.
3.) Flow reductions due to retirements of Units 1 and 2 in 2011 and 2012, respectively, resulted in 633.6 MGD or 43.1% less cooling water withdrawn from combined DIF.
4.) Exelon concludes that a CCRS or fine mesh modified traveling screens would result in reduced reliability of local energy delivery, but the likelihood was not quantified.
5.) The operation of a CCRS is the only technology that would result in significant water consumptive losses due to evaporation and would require a DRBC consumptive use replacement plan.
6.) Exelon concludes that there are no sufficient alternative water sources available.

In summary, BTA for both impingement mortality and entrainment for this permit includes maintaining an average 24-month CUR of less than 8% and implementing a Flow Reduction Alternative SOP proposed in the permit application which will further reduce withdrawals by limiting CWP usage.

The Flow Reduction Alternative SOP limits cooling water pump operation to periods of power generation which do not correspond to peak impingement abundances (September – November). It is estimated to reduce average intake flow 4.5% July – September which corresponds to peak impingement abundances of some diadromous species and includes the following measures:

1. One river water pump (RWP) per unit will remain in service throughout the year to provide water needed for essential station operations.

2. During the 12-hour start-up process prior to generating electricity, both cooling water pumps (CWPs) and the second RWP per unit will be placed in service.

3. During electricity generation, both CWPS and both RWPs per unit will remain in service.

4. At the beginning of the shut-down process, one CWP and one RWP per unit will be removed from service. The remaining CWP per unit will remain in service until the turbines' temperatures have cooled to 150°F (approximately 10 days), at which point Exelon will take that CWP out of service.

See the attached BTA worksheet:

[EMBED Excel.Sheet.12]

(ii) Clarification on the status of Outfall 005: The facility has eliminated Outfall 005 completely. The last discharge from Outfall 005 was in September 2014. Since that time the Shut-off valve has been closed. The catch basin was permanently closed with a concrete plug on December 7, 2018. A rubber plug was also installed at the end of the pipe. The rubber plug was installed by DRBC.

Internal Review and Recommendations

(iii) Clarification on the PCB monitoring requirement: This facility is listed in the Delaware River PCB TMDL report with WLAs for Outfalls 001, 005, 007 and 008. Outfall 005 is eliminated from the site completely and no longer discharging. PCB monitoring requirement at Outfall 005 is discontinued with the agreement of DRBC. In the past, facility was discharging industrial treatment plant effluent through either Outfall 007 (via MP 107) or Outfall 008 (via MP 108). Therefore, it was decided to monitor PCB at MP 107 originally. Sometime during the 2008 - 2013 permit term, the facility stopped discharging industrial treatment plant effluent through MP 107. Therefore, PCB monitoring was changed to MP 108 with the agreement of DRBC. Now the permit requires PCB monitoring at Outfall 001 and MP 108.

Permittee submitted comments on the draft permit on August 13, 2020. See the below attached:

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The following responses were provided to the permittee by email:

[EMBED AcroExch.Document.DC] [EMBED AcroExch.Document.DC]
The requirement regarding the Cooling Water Intake Structure in Part C of the permit is revised based on the permittee's request. Mailing address is also revised in the permit documents.

No other comments were received.

Nothing else is changed in the permit. Finalizing the permit with the revisions.